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ABSTRACT

In order to determine the capacity of high schools to profit from the pre-high school computer experiences of its students, a study was conducted to measure computer utilization in selected high schools of Middle Tennessee. Questionnaires distributed to 50 principals in 28 school systems covered the following areas: school enrollment; number and brand(s) of computers; plans for increasing the number of computers; source of funds for computer purchases; uses of computers; importance of computers as an instructional tool; and type of training received by teachers using computers. Analyses of the data from the 28 usable questionnaires returned indicate that: (1) there were 23,280 students in grades 9-12 enrolled in the responding schools; (2) the total number of computers in the 28 schools was 340; (3) Radio Shack and Apple were the principal manufacturers (84.5%) of school-owned computers; (4) a mean of 12.5 computers per school and a mean of 831 students per school resulted in a computer to student ratio of 0.0150 to 1; (5) if each school increased its computer inventories as planned by the end of the 1987 school year, the total in the reporting schools would be 495, improving the computer to student ratio only slightly; (6) most schools used a combination of acquisition practices for computers; (7) mathematics courses most frequently involved computers in the instructional process; (8) 23 of the responding schools used their computers most frequently in classroom situations; (9) 68% of the schools had computer programming classes; (10) 17% of the schools perceived an improvement in the quality of instruction as a result of computer use; (11) primary uses of school-based computers were for pupil accounting; (12) 32% of the teachers were trained by vendors; and (13) the computer ranked fourth--behind textbooks, the chalkboard, and the overhead projector--as an effective instructional tool. A short list of references completes the report. (JB)

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COMPUTER UTILIZATION IN MIDDLE TENNESSEE HIGH SCHOOLS

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Introduction

Conventional wisdom of the state legislature and computer enthusiasts responsible for adding the "Computer Skills Next" program to Tennessee's 1984 Comprehensive Education Reform Act for seventh and eighth grade students must have assumed a high school curriculum that reinforced and utilized skills taught and learned at the pre-high school level. It is not difficult to understand the position of the legislature as it made decisions that relate to the education of the states' children when confronted with data suggesting that computer assisted instruction improves motivation and achievement of students.

Problem Statement

It is generally assumed that pre-high school experiences are primary vehicles for the development of skills and attitudes necessary to succeed at the high school or later life stages. However, the capability of the high school to profit from the pre-high school experiences of its students must be determined. Therefore, this study attempted to determine computer utilization in selected high schools of Middle Tennessee.

Significance of the Study

Whenever major changes occur at the pre-high school level that require large sums of public money and heighten general expectations, the ability to achieve becomes significant. It also places additional responsibility on high schools to refine their activities to accommodate successful pre-high school achievement. Given that the "Computer Skills Next" program is state funded and high school computer services are local responsibilities, it is significant to know whether high schools are in a position to capitalize on the computer

skills developed at the seventh and eighth grade levels.

Research Procedure and Results

A questionnaire was used to determine the availability and use of computers in the sample of schools.

1. Questionnaires were distributed to the principal of at least one high school in each of the twenty eight school systems of Middle Tennessee for a total of fifty schools.

2. The areas covered on the questionnaire were the following:
   a. school enrollment
   b. number and brand of computer
   c. plans for increasing the number of computers
   d. source of funds for computer purchases
   e. uses of computers
   f. importance of computers as instructional tools
   g. type of training received by teachers using computers

Frequencies were the statistical procedure used to treat the data. Findings are presented for each item on the questionnaire.

1. How many students are enrolled in the school?

Twenty eight schools returned usable questionnaires showing a student enrollment of 23,280 students in grades nine through twelve.

2. How many computers do you have by manufacturer?

a.	Radio Shack	148	d.	IBM	19
b.	Apple	147	e.	Texas Ins.	1
c.	Commodore	30	f.	Others	5

Radio Shack and Apple were the principle manufacturer (84.5%) of school owned computers, followed by Commodore, IBM, Other, and Texas Instruments for a reported total of 349 computers. A mean of 12.5 computers per school and a mean of 831 students per school revealed a student to computer ratio of 0.0150 to 1.

3. What are your plans for increasing the number of computers in your school?

1984-1985	14 schools	99 computers
1985-1986	6 schools	42 computers

1986-1987 1 school 5 computers

If each school increases their computer inventories as planned by the end of the 1987 school year, there would be 495 computers in the reporting schools, improving the computer to student ratio only slightly.

4. What is the source of funding for purchasing computers for your school?

a.	regular school funds	68%
b.	school level fund raising activities	43%
c.	school level private contribution	21%
d.	other school level means	32%

Funds for high school computer purchases are derived from a variety of sources, with most schools reporting a combination of acquisition practices. Urban schools tended to receive more regular school funds for computer purchases than did rural schools. Overall, school level funding accounted for a majority of on-hand school level computers.

5. In what courses are computers used? Indicate weekly time allocations and number of students involved.

Mathematics courses were the courses indicated most frequently in which computers are used as part of the instructional process, followed by Computer Science courses, Vocational Education activities and Science. Bookkeeping, Accounting and English completed the course use list. Time allocated for computer instructional activities, including all courses, was 580 hours per week, (or 30 minutes per week for each student) providing experiences for 2,596 students constituting 15% of the available student enrollments.

6. How are the computers in your school used most frequently?

The response categories for this question were: instruction in regular classrooms; instruction in computer laboratories; and enrichment activities, such as games and puzzles.

Twenty-three of the responding schools indicated that their computers were used most frequently in classroom instruction. Eighteen schools had computer laboratories, and seventeen schools reported that enrichment was the major activity of their computer services.

7. Are students taught to write computer programs?

Nineteen schools responded "yes" and nine responded "no", indicating that 68% of the schools had computer programming classes.

8. Do you think computers improves the quality of instruction?

Seventeen of the respondent schools perceived an improvement

in the quality of instruction as a result of computer use. The remaining school respondents were undecided.

9. What are the administrative tasks performed by computers at the school level?

   Primary uses of school based computers were in the area of pupil accounting (attendance, student reports, and scheduling). Bookkeeping and inventory were the next most frequent operations performed by computer.

10. What kind of training has the teacher using the computer had?

a.	training at the school by vendors	13
b.	training in special classes by vendors	9
c.	college/University courses	23
d.	self-taught	20
e.	state sponsored workshops	3

   Of the 68 teachers reported involved in the computer activities of the responding schools, 32% were trained by vendors, 33% had participated in credit courses, 29% were self taught, and 4% were trained through state workshops.

11. Rank the following instructional tools for teaching effectiveness:

a.	textbooks	1st	d.	VCR	6th
b.	overhead projector	3rd	e.	chalkboard	2nd
c.	16 mm projector	5th	f.	computer	4th

Discussion of Findings

These findings raise several educational and economic questions concerning computer availability and utilization in Middle Tennessee high schools. Educationally, high school personnel should know if there is a defined role or general local and state expectations for computer services at the high school level based on experiences that pre-high students are receiving through the "Computer Skills Next" program.

Educationally, assuming the role of the high school is to continue the development of skills developed and attitudes acquired at the pre-high school level, the question of staff preparation or certification (which currently does not exist in Tennessee) must be addressed, given the percentage (33%) of

computer teachers with credit course experiences in computer operations. In addition to the need for extensive preparation for computer instructional personnel, instructional personnel of all subject areas along with school level administrators need computer awareness exposure based on the perception reflected regarding effective teaching tools, where chalkboards out rank computers.

Economically, notwithstanding the possible changes in teacher preparation and attitudes, providing a reasonable computer to student ratio under current funding arrangements would place the local school in a difficult fund-raising position. If schools are expected to play a significant role in computer education and must add this service to their systems' current funding obligations, a myraid of proposal for tax increase, program cuts and elimination would surface. This probably would delay the service long past the entrance of the first group of computer literate pre-high school students into high school.

Hopefully, the computer revolution in education will not end up outmoded, stashed in corners of storerooms gathering dust like TV sets who were a part of another greatest invention era. It is hoped that computers will be purchased only after (1) it has been determined how they can be useful in achieving specified objectives, (2) teachers have been prepared to accept and utilize computers with ease, understanding and efficiency, and (3) funding is available to do whatever is necessary to install and maintain all of the support systems required to operate an effective computer assisted and/or driven instructional program.

Careful planning should prevent computers from being put on the stockpile of educational revolutions that have failed.

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